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LETTER AND ATTACHED RESPONSE TO U S EPA REGION V COMMENTS ON THE DRAFT CORRECTIVE MEASURES PROPOSAL FOR (SWMU 5) OLD BURN PIT NSA CRANE IN
02/23/2010
TETRA TECH NUS INC

TETRA TECH

PITT-02-10-040

February 23, 2010

Project No. 112GN4267

Mr. Howard Hickey
NAVFAC MW
201 Decatur Avenue
Building 1A, Code EV
Great Lakes, Illinois 60088

Subject: CLEAN Contract N62467-94-D-0888
Contract Task Order No. 0256

RE: ***Final***
Responses to United States Environmental Protection Agency (EPA) Comments Dated November 25 and December 7, 2009 on Corrective Measures Proposal (CMP) for Solid Waste Management Unit (SWMU) 5 (Old Burn Pit)

Dear Mr. Hickey:

Enclosed are the subject Responses to EPA comments that incorporate the February 17, 2010 comments. An electronic version of these comments is being transmitted via electronic mail (e-mail).

Upon Navy approval of these comment responses, the SWMU 5 CMP will be updated to include these responses and the previous responses to EPA comments dated June 13, 2007 and May 14, 2008. A revised SWMU 5 CMP will then be issued.

Please contact Valerie Plachy at 412-921-8389 (e-mail: Valerie.Plachy@tetratech.com) or the undersigned at 412-921-8308 (e-mail: Ralph.Basinski@tetratech.com) regarding any questions or comments.

Sincerely,

Ralph R. Basinski
Project Manager

RRB:VJP/mlg
Enclosures

cc: Mr. Tom Brent (letter and copies of enclosure)
Mr. Chris Pike, Tetra Tech (letter and enclosure)
Ms. Valerie Plachy, Tetra Tech (letter and enclosure)
Mr. Ralph Basinski, Tetra Tech (letter and enclosure)
Project File – CTO 0256

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ENCLOSURE 1

RESPONSE TO UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)
NOVEMBER 25, AND DECEMBER 7, 2009 COMMENTS
REGARDING FURTHER CLARIFICATION TO
RESPONSES TO MAY 14, 2008 EPA COMMENTS
DRAFT CORRECTIVE MEASURES PROPOSAL (CMP)
OLD BURN PIT (OBP) (SWMU 5)
NAVAL SURFACE WARFARE CENTER (NSWC) CRANE
CRANE, INDIANA

February 23, 2010

**NOVEMBER 25, 2009 (PETER RAMANAUSKAS) AND DECEMBER 7, 2009 (DANIEL MAZUR)
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)
REQUEST FOR FURTHER CLARIFICATION REGARDING
RESPONSE TO EPA COMMENTS DATED MAY 14, 2008 ON THE
DRAFT CORRECTIVE MEASURES PROPOSAL (CMP) FOR OLD BURN PIT (OBP) (SWMU 5)
NAVAL SURFACE WARFARE CENTER (NSWC) CRANE
CRANE, INDIANA**

EPA comments are shown in bold font. Navy responses to each comment are shown in regular font. Text changes to the CMP are shown in italic font enclosed in quotation marks within the response.

**EPA-1 (11-25-09)**
**The main thing we should do is cleanup Table 2-12 a bit to reflect only the number that you will use as your target level/MCS for GW/SW. Perhaps Page 2 of the table can be moved someplace else within the CMP document. To help simplify the table for dioxin/furan, consider using your congener specific analytical results to calculate the Dioxin-TEQ concentration and compare to your MCS for 2,3,7,8-TCDD.**

Response to EPA-1(11-25-09):
Table 2-12 has been revised to express dioxins as Total Dioxin 2,3,7,8-TCDD TEQ. The revised Table 2-12 is presented in Attachment 1 to this comment response document. Additionally, information other than groundwater and surface water MCSs have been placed into an Appendix as Table A-1. The new Table A-1 is presented as Attachment 2 to this comment response document.

The 1st paragraph in Section 2.5.2 has been revised as follows:

> *"2.5.2 Groundwater*
>
> *"MCSs have been developed for the chemicals that were detected in groundwater during the SWMU 5 RFI investigation and are presented in Table 2-12. Table 2-12 also presents the surface water MCSs. Human Health Water Quality derived for the protected and un-protected water sources and the Chronic Aquatic Life Criteria are presented in Table A-1."*

**I want to check in with Dan on the Aquatic Life Criteria.**

**EPA-1 (11-25-09)(12-7-09)a**
**[Peter Ramanauskas additional comment]**
**As mentioned in my earlier email to you on this, we should simplify the table a bit. For the Surface Water MCS column, I would recommend we use the chronic Aquatic Life Criteria as they are most conservative in most cases.**

Response to EPA-1(11-25-09)(12-7-09)a:
The lower of the Chronic Aquatic Life Criteria, Region 5 RCRA Ecological Screening Level, or IDEM calculated value was used to determine the surface water MCSs. The revised Table 2-12 is presented as Attachment 1 to this comment response document.

**EPA-1 (11-25-09)(12-7-09)b**
**[Daniel Mazur comments on the Aquatic Life Criteria]**
**I reviewed the proposed media cleanup standards for Chronic Aquatic Life Criteria (Table 2-12, page 1 of 2) and have the following comments:**

1. **For bis (2-ethylhexyl) phthalate the Region 5 RCRA ecological screening levels (ESL) value of 0.3 ug/l needs to be used. See footnote "q" from the ESL table.**

2. **For barium and manganese check the calculation of the Tier 2 values. Using the equations cited for footnote 6 in the Table 2-12, the Tier 2 values are 209 ug/l and 287 ug/l for barium and manganese, respectively.**

3. **The hardness dependent criteria needs to be revisited after site water hardness data (including surface water) is collected.**

4. **The url for footnote 6 needs to be updated. www.in.gov/idem/files/great_lakes_criteria_values.pdf**

5. **The label for "Volatile Organics" is misspelled.**

Response to EPA-1(11-25-09)(12-7-09)b:

Item 1: Table 2-12 footnote for bis (2-ethylhexyl) phthalate has been revised to 0.3 µg/L per EPA, Region 5, RCRA. ESL (http://www.epa.gov/reg5rcra/ca/ESL.pdf).

Item 2: Barium surface water MCL has been revised to 209 µg/L. However, the EPA Recommended Water Quality Criteria (WQC) (EPA, 2009). http://www.epa.gov/waterscience/criteria/wqctable/index.html provides for a Human Health for the consumption of water plus organism of 50 µg/L for manganese. Therefore, 50 µg/L is being used because it is lower than the 287 µg/L calculated Tier 2 values.

Item 3: Hardness dependent criteria will be addressed as part of the Corrective Measure Implementation Plan as appropriate and is not discussed as part of the CMP.

Item 4: Due to the incorporation of the EPA recommendation to reorganize Table 2-12, former Footnote 6 is now Footnote 8. Footnote 8 has been revised as follows:

*"8 USEPA Recommended Water Quality Criteria (USEPA, 2009). http://www.epa.gov/waterscience/criteria/wqctable/index.html".*

Additionally, Footnote 2 has been revised as follows:

*"2 Unless otherwise noted, the MCS is based on Chronic Aquatic Life Criteria. EPA, Region 5, RCRA. ESL (http://www.epa.gov/reg5rcra/ca/ESL.pdf)."*

Item 5: "Volatice Organics" has been correct to "Volatile Organics."

**EPA-2 (11-25-09)**
**Also, please check the table for typos - I noticed "cancer slop factor" in footnote 5, there are two footnotes labeled '6', and "volatice organics" in the table headings.**

Response to EPA-2(11-25-09):
The following typographical errors have been corrected in Table 2-12:

- Footnote 5 has been eliminated due to incorporation of EPA recommended Table 2-12 revisions.

- "Volatice Organics" has been corrected to "*Volatile Organics.*"
- Various Table 2-12 footnotes have been modified to accommodate to this table.

The revised Table 2-12 is presented as Attachment 1 to this comment response document.

**EPA-3 (11-25-09)**
**For EPA-2 (5-14-08)f: the version of Table 2-11 that I have (from October 08) still has a section titled "National Primary Drinking Water Regulations" even though the table deals with soils.**

Response to EPA-3(11-25-09):
"National Primary Drinking Water Regulations" references have been removed from Table 2-11. The revised Table 2-11 is presented as Attachment 3 to this comment response document.

**EPA-4 (11-25-09)**
**For EPA-2 (5-14-08)g: The response is okay, but correct the text in Table 2-1 to reflect this.**

Response to EPA-4(11-25-09):
The response to EPA-2(5-14-08)g stated, "The CMP recommendation was that groundwater will be monitored (i.e., groundwater cleanup will not be implemented). Hydraulic conductivity data will be collected as part of the first round of groundwater monitoring. Details for groundwater monitoring will be developed in the Corrective Measures Implementation Plan."

The following footnote has been added to the Comments column for Groundwater in Table 2-1 (see Attachment 4 to this comment response document):

> *"2 - Hydraulic conductivity data will be collected as part of the first round of groundwater monitoring. Details for groundwater monitoring will be developed in the Corrective Measures Implementation Plan."*

# ATTACHMENT 1

# REVISED TABLE 2-12

TABLE 2-12

MEDIA CLEANUP STANDARDS FOR SURFACE WATER AND GROUNDWATER
CMP REPORT FOR SMWU 5 - OLD BURN PIT
NSWC CRANE
CRANE, INDIANA

| CASRN | Chemical | MCS | |
|---|---|---|---|
| | | Groundwater[1] (µg/L) | Surface Water[2] (µg/L) |
| **Dioxins** | | | |
| 1746-01-6 | Total Dioxin 2,3,7,8-TCDD TEQ[3] | 0.00003 [4] | 0.0005 [5] |
| **Volatile Organics** | | | |
| 67-66-3 | Chloroform* | 80 [4] | 140 |
| 75-35-4 | 1,1-Dichloroethene | 7 [4] | 65 |
| 156-59-2 | cis-1,2-Dichloroethene | 70 [4] | 620 [6] |
| 156-60-5 | trans-1,2-Dichloroethene | 100 [4] | 560 [5] |
| 79-01-6 | Trichloroethene | 5 [4] | 260 [6] |
| 75-01-4 | Vinyl chloride | 2 [4] | 97 [5] |
| **Semi-Volatile Organics** | | | |
| 117-81-7 | Bis(2-ethylhexyl) phthalate | 6 [4] | 0.3 |
| **Metals** | | | |
| 7429-90-5 | Aluminum | 36,000 [7] | 87 [8] |
| 7440-36-0 | Antimony | 6 [4] | 5.6 [8] |
| 7440-38-2 | Arsenic | 10 [4] | 46.7 [5] |
| 7440-39-3 | Barium | 2,000 [4] | 209 [5] |
| 7440-50-8 | Copper | 1,300 [4] | 1.58 |
| 7439-89-6 | Iron | 25,550 [5] | 1,000 [5,8] |
| 7439-92-1 | Lead | 15 [4] | 1.17 [2,6] |
| 7439-96-5 | Manganese | 775 | 50 [8] |
| 7440-62-2 | Vanadium | 36.5 [5] | 12 |
| 7440-66-6 | Zinc | 11,000 [9] | 65.7 |

µg/L - microgram per liter.
CASRN - Chemical Abstract Services Registry Number.
ESC - Ecological Screen Level
IDEM - Indiana Department of Environmental Management.
USEPA - United States Environmental Protection Agency.
RCRA - Resource Conservation & Recovery Act of 1976.
RISC - Risk Integrated System of Closure.
PRG - Preliminary Remediation Goal.
MCS - Media cleanup standard.

* Asterisks indicate a chemical for which the laboratory reporting limit (RL) exceeds the risk-based target level for the project.

1 MCS assumes that groundwater is used as a domestic water supply source.

2 Unless otherwise noted, the MCS is based on Chronic Aquatic Life Criteria. EPA, Region 5, RCRA. ESL (http://www.epa.gov/reg5rcra/ca/ESL.pdf)

3 Dioxin-TEQ concentration as 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).

4 USEPA Primary Drinking Water Standard (USEPA, Summer 2006).

5 Calculated according to Indiana Administrative Codes 327 IAC 2-1-8-5 and 2-1-8-6. Note that the cancer target risk for IDEM is 1E-05.

6 IDEM, Criteria and Values for Selected Substances Calculated Using the Great Lakes Basin Methodologies www.in.gov/idem/files/great_lakes_criteria_values.pdf.

7 USEPA Region 9 PRG Tables (October 2004). PRGs based on cancer are adjusted to meet a target risk of 1E-05, as per IDEM.

8 USEPA Recommended Water Quality Criteria (USEPA, 2009). http://www.epa.gov/waterscience/criteria/wqctable/index.html

9 IDEM, RISC residential closure levels for groundwater (IDEM, January 2006), unless otherwise noted.

# ATTACHMENT 2

# NEW APPENDIX TABLE A-1

TABLE A-1

INDIANA HUMAN HEALTH WATER QUALITY STANDARDS AND CHRONIC AQUATIC LIFE CRITERIA
CMP REPORT FOR SMWU 5 - OLD BURN PIT
NSWC CRANE
CRANE, INDIANA


| CASRN | Chemical | Water + Fish | | Water only | | Chronic Aquatic Life Criteria (µg/L) |
|---|---|---|---|---|---|---|
| | | Protected Water Supply (µg/L) | Unprotected Water Supply (µg/L) | Protected Water Supply (µg/L) | Unprotected Water Supply (µg/L) | |
| **Dioxins** | | | | | | |
| 3268-87-9 | 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (1,2,3,4,6,7,8,9-OCDD) | 0.000002 | 0.000002 | 0.008 | 2 | NA |
| 39001-02-0 | 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-HpCDF) | 0.00000007 | 0.00000007 | 0.0002 | 0.05 | NA |
| 35822-46-9 | 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-HpCDD) | 0.00000007 | 0.00000007 | 0.0002 | 0.05 | NA |
| 1746-01-6 | 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)* | 0.0000000007 | 0.0000000007 | 0.000002 | 0.0005 | NA |
| 37871-00-4 | Total Heptachlorodibenzo-p-dioxin (Total HpCDD) | NA(1) | NA(1) | NA(1) | NA(1) | NA(1) |
| 38998-75-3 | Total Heptachlorodibenzofuran (Total HpCDF) | NA(1) | NA(1) | NA(1) | NA(1) | NA(1) |
| **Volatile Organics** | | | | | | |
| 67-66-3 | Chloroform* | 280 | 1,400 | 350 | 70,000 | 140 (3) |
| 75-35-4 | 1,1-Dichloroethene | 1,300 | 4,600 | 1,800 | 350,000 | 65 (3) |
| 156-59-2 | cis-1,2-Dichloroethene | 290 | 1,500 | 350 | 70,000 | 620 (2) |
| 156-60-5 | trans-1,2-Dichloroethene | 520 | 2,100 | 700 | 140,000 | 560 (2) |
| 79-01-6 | Trichloroethene | 12 | 23 | 27 | 5,400 | 260 (2) |
| 75-01-4 | Vinyl chloride | 0.2 | 2 | 0.2 | 47 | 930 (2) |
| **Semi-Volatile Organics** | | | | | | |
| 117-81-7 | Bis(2-ethylhexyl) phthalate | 0.003 | 0.003 | 25 | 5,000 | 0.3 (3) |

TABLE A-1

INDIANA HUMAN HEALTH WATER QUALITY STANDARDS AND CHRONIC AQUATIC LIFE CRITERIA
CMP REPORT FOR SMWU 5 - OLD BURN PIT
NSWC CRANE
CRANE, INDIANA


| CASRN | Chemical | Water + Fish | | Water only | | Chronic Aquatic Life Criteria (µg/L) |
|---|---|---|---|---|---|---|
| | | Protected Water Supply (µg/L) | Unprotected Water Supply (µg/L) | Protected Water Supply (µg/L) | Unprotected Water Supply (µg/L) | |
| **Metals** | | | | | | |
| 7429-90-5 | Aluminum | 33,900 | 903,000 | 35,000 | 7,000,000 | 87 (4) |
| 7440-36-0 | Antimony | 9.3 | 27.7 | 14 | 2,800 | 80 (2) |
| 7440-38-2 | Arsenic | 0.076 | 0.16 | 0.23 | 46.7 | 150 (4) |
| 7440-39-3 | Barium | 785 | 884 | 7,000 | 1,400,000 | 209 (2) |
| 7440-50-8 | Copper | 142 | 158 | 1,400 | 280,000 | 1.58 (3,5) |
| 7439-89-6 | Iron | 7,000 | 9,780 | 24,500 | 4,900,000 | 1,000 (4) |
| 7439-92-1 | Lead | NA | NA | NA | NA | 1.17 (3,5) |
| 7439-96-5 | Manganese | 408 | 973 | 700 | 140,000 | 50 (4) |
| 7440-62-2 | Vanadium | 35 | 7,000 | 35 | 7,000 | 12 (2,3) |
| 7440-66-6 | Zinc | 393 | 408 | 10,500 | 2,100,000 | 58 (5) |

µg/L - microgram per liter. CASRN - Chemical Abstract Services Registry Number.

* Asterisks indicate a chemical for which the laboratory reporting limit (RL) exceeds the risk-based target level for the project.

1 No cancer slop factor or toxicity equivalent factors are available to estimate alternative water quality standards.

2 IDEM, Criteria and Values for Selected Substances Calculated Using the Great Lakes Basin Methodologies www.in.gov/idem/files/great_lakes_criteria_values.pdf.

3 EPA, Region 5, RCRA. ESL (http://www.epa.gov/reg5rcra/ca/ESL.pdf)

4 USEPA Recommended Water Quality Criteria (USEPA, 2006). http://www.epa.gov/waterscience/criteria/wqctable/index.html

5 IDEM, Water Quality Standards (based on a water hardness of 50 mg/L). http://www.in.gov/legislative/iac/T03270/A00020.PDF

# ATTACHMENT 3

# REVISED TABLE 2-11

TABLE 2-11

MEDIA CLEANUP STANDARDS FOR SURFACE AND SUBSURFACE SOIL
CMP REPORT FOR SMWU 5 - OLD BURN PIT
NSWC CRANE
CRANE, INDIANA

| COC | Media Cleanup Standards[1] | |
|---|---|---|
| | Surface Soil (mg/kg) | Subsurface Soil (mg/kg) |
| **Construction Worker** | | |
| Antimony | 140[2] | 140[2] |
| Iron | 106,000[3] | 106,000[3] |
| Lead | 970[2] | 970[2] |
| Manganese | (1) | (1) |
| **Maintenance Worker** | | |
| Antimony | 620[4] | (1) |
| Iron | 1,000,000[3] | (1) |
| Lead | 1,300[4] | (1) |
| Manganese | (1) | (1) |
| **Industrial Worker** | | |
| Antimony | 620[4] | (1) |
| Iron | 1,000,000[3] | (1) |
| Lead | 1,300[4] | (1) |
| Manganese | (1) | (1) |
| **Future Child Resident** | | |
| Antimony | 31.3[5] | 31.3[5] |
| Iron | N/A | N/A |
| Lead | N/A | N/A |
| Manganese | (1) | (1) |
| **Future Resident** | | |
| Lead | 400[1] | (1) |
| Manganese | (1) | (1) |
| **Future Adult Resident** | | |
| Manganese | (1) | (1) |

1 - The MSC for constituents not specifically listed are the IDEM Closure Level for the appropriate receptor.
2 - IDEM Closure Level for Construction Workers based on direct contact.
3 - MCS calculated based on the SWMU 5 risk assessment (See Section 2.5).
4 - IDEM Industrial Closure Level based on direct contact.
5 - The MSC for manganese is calculated based on USEPA Region IX guidelines. Per USEPA guidelines, the calculation are for the future resident only.

µg/L - micrograms per liter
COC - Chemical of concern.
IDEM - Indiana Department of Environmental Management.
MCL - Maximum Contaminant Level.
MCSs - Media cleanup standards.
mg/kg - milligrams per kilogram
N/A - not applicable to this media for this COC.
RCRA - Resource Conservation and Recovery Act.
RFI - RCRA Facility Investigation.
USEPA - United States Environmental Protection Agency.

# ATTACHMENT 4

# REVISED TABLE 2-1

TABLE 2-1

SUMMARY OF RFI REPORT HUMAN HEALTH RISK CONCLUSIONS
CMS REPORT FOR SWMU 5 (OLD BURN PIT)
NSWC CRANE
CRANE, INDIANA


| Chemical of Concern[1] | Impact on Human Receptors | Comments |
|---|---|---|
| **SURFACE SOIL** | | |
| Dioxins/Furans | Maintenance Worker ILCR = 1.4E-6, Recreational User ILCR = 3.3E-6, Trespasser ILCR = 1.1E-6, Residential ILCR = 5.7E-5 | Dioxins were detected in 8 of 8 soil samples. Elevated risks (across all pathways) for dioxins are based on the hypothetical future residential land use. Risks calculated for receptors under current and industrial land use are within the EPA's target risk range. Concentrations of dioxins/furans (as TEQs) in all surfce soil samples were less than the 1 µg/kg preliminary remediation goal established by the U.S. EPA. |
| Polyaromatic hydrocarbons | Residential ILCR = 1.8E-5 | Risks calculated for receptors under current land use are within the EPA's target risk range. Total risks from PAHs in soil are less than 1.0E-4 for all receptors. Concentrations of PAHs in soil are within levels occurring in soil in the U.S. |
| Antimony | Adult resident HQ = 1.0, Child resident HQ = 9.6 | Risks for antimony are based on the hypothetical future residential land use based on the concentration in one soil sample. The sample may represent a "hotspot" at the site. |
| Iron | Adult resident HQ = 0.24, Child resident HQ = 2.2 | Risks for iron are based on the hypothetical future residential land use but do not pose a risk under current land use. Risks calculated for iron are not based on adverse health effects but rather on recommended daily allowances. |
| Lead | Future Residents - Predicted blood lead levels in children greater than U.S. EPA recommemded levels | Risks for lead are based on the hypothetical future residential land use driven by the concentration in one surface soil sample. The sample may represent a "hotspot" at the site. |
| **SURFACE/SUBSURFACE SOIL** | | |
| Dioxins/Furans | Construction Worker ILCR = 2.7E-6 | Total lifetime cancer risk for future construction workers across all exposure pathways is within the U.S.EPA's target risk range (1.0E-6 to 1.0E-4). Concentrations of dioxins/furans (as TEQs) in all surface/subsurface soil samples were less than the 1 µg/kg preliminary remediation goal established by the U.S. EPA. |
| Antimony | Construction Worker HQ = 2.1 | Risks for the construction worker are based on the concentration in one surface soil sample. The sample may represent a "hotspot" at the site. |
| Lead | Construction Worker - More than 5 % of the fetuses born to construction workers predicted to have blood lead levels greater than 10 µg/dL | Risks to the future construction worker are based on the average concentration in soil samples (>1,000 mg/kg). Lead concentrations in approximately 1/2 of subsurface soil samples were greater than 1,000 mg/kg. |

TABLE 2-1

SUMMARY OF RFI REPORT HUMAN HEALTH RISK CONCLUSIONS
CMS REPORT FOR SWMU 5 (OLD BURN PIT)
NSWC CRANE
CRANE, INDIANA


| Chemical of Concern[1] | Impact on Human Receptors | Comments |
|---|---|---|
| **GROUNDWATER** | | |
| Dioxins/Furans | Construction Worker ILCR = 2.7E-6, Residential ILCR = 4.1E -4 | Risks from dioxins in groundwater are based on the hypothetical future residential use but do not pose a risk under current and industrial and use. Dioxins were detected in 10 of 14 groundwater samples indicating that groundwater has been impacted by site activities. Concentrations of dioxins (as TEQs) in all samples were less than the MCL for 2,3,7,8-TCDD. |
| Bis(2-ethylhexyl)phthalate | Residential ILCR = 6.0E-6 | Bis(2-ethylhexyl)phthate was detected in 1 of 14 samples and is a common laboratory contaminant. Estimated risks are based on future residential use of groundwater. |
| Arsenic | Residential ILCR = 2.5E-5 | Risks for arsenic are based on the hypothetical future residential use of groundwater. The maximum concentration in groundwater (1.6 mg/L) is less than the current (50 mg/L) and recently proposed (10 mg/L) MCLs. In addition, the concentrations of arsenic in groundwater samples are similar to the concentrations in the upgradient well. |
| Manganese | Adult resident HQ = 2.9, Child resident HQ = 10 | Risks for manganese are based on the hypothetical future residential use of groundwater. |
| **SURFACE WATER** | | |
| 1,1-Dichloroethene | Residential ILCR = 5.0E-6 | Risks from chlorinated volatiles (especially, vinyl chloride) in surface water are based on the hypothetical future land use but do not pose a risk under current or industrial land use. The risks are overestimated based on potential residential exposure to surface water which assumes that future residents are assumed to be exposed to surface water 350 days/year. Vinyl chloride was detected in 2 of 4 samples which appear to be hydraulically connected.[2] |
| cis-1,2-Dichloroethene | Adult resident HQ = 0.21; Child resident HQ = 0.21 | |
| Trichloroethene | Adult resident HQ = 0.21; Child resident HQ = 0.21, Residential ILCR = 5.8E-6 | |
| Vinyl Chloride | Adult resident HQ = 0.17, Child resident HQ = 0.16, Residential ILCR = 3.2E-4 | |

HQ - Hazard Quotient.
ILCR - Incremental Lifetime Cancer Risk
1 Any carcinogenic chemical with a ILCR greater than 1.0E-6 or a noncarcinogenic chemical contributing to target organ hazard indices (HI) greater than 1.0.
2 Hydraulic conductivity data will be collected as part of the first round of groundwater monitoring. Details for groundwater monitoring will be developed in the Corrective Measures Implementation Plan.